Patent claims

1. A layer structure (1),
at least comprising a substrate (4) and an at least partially porous, at least partially gas-permeable layer (7) on the substrate (4), the substrate (4) having cooling passages (16), through which a cooling medium can pass through the substrate (4) into the porous layer (7),

characterized in that

the porous layer (7) has pores (10) which are delimited by walls (37), at least one coating (40) being present on at least part of the walls (37).

2. The layer structure as claimed in claim 1,
characterized in that

the layer (7) is metallic or ceramic.

3. The layer structure as claimed in claim 1,
characterized in that

the substrate (4) is metallic or ceramic.

4. The layer structure as claimed in claim 1 or 2,
characterized in that

the layer (7) is in foam-like or sponge-like form.

5. The layer structure as claimed in claim 1, characterized in that

the coating (40) is a ceramic layer, in particular a thermal barrier coating.

6. The layer structure (1) as claimed in claim 1, 2, 3 or 4, characterized in that

the materials of the substrate (4) and the layer (7) are different.

7. The layer structure (1) as claimed in claim 1 or 4, characterized in that

the layer (7) has cooling passages (19).

8. The layer structure (1) as claimed in claim 7, characterized in that

the cooling passages (19) are formed by gas-permeable connections (20) between pores (10) in the layer (7) and the pores (10).

9. The layer structure (1) as claimed in claim 1, 7 or 8, characterized in that

the cooling passages (16, 19) have different internal cross sections, in particular internal diameters, thereby defining the flow of a cooling medium through the cooling passages (16, 19).

10. The layer structure (1) as claimed in claim 1 or 4, characterized in that

the pore size of the layer (7) is locally variable.

11. The layer structure (1) as claimed in claim 10, characterized in that

the pore size is smaller toward the outer surface (43) of the layer (7) than in the vicinity of the substrate (4).

12. The layer structure (1) as claimed in claim 1, 2 or 4, characterized in that

the layer (7) has the composition MCrAlX,
where M is at least one element selected from the group consisting of iron (Fe), cobalt (Co) or nickel (Ni) and
X is the element yttrium (Y) and/or at least one rare earth element.

13. The layer structure (1) as claimed in claim 1 or 3, characterized in that

the substrate (4) is a nickel-base or cobalt-base superalloy.

14. The layer structure (1) as claimed in claim 1, 2 or 3, characterized in that

the materials of the substrate (4) and the layer (7) are identical.

15. The layer structure (1) as claimed in claim 1 or 5, characterized in that

only a surface region (13) of the layer (7) is provided with the at least one coating (40).

16. The layer structure (1) as claimed in claim 1, characterized in that

the layer structure (1) is at least part of a turbine component,
in particular a turbine blade or vane (120, 130) or a lining (155) of a combustion chamber (110),
in particular of a gas turbine (100).

17. The layer structure (1) as claimed in claim 1, 15 or 16, characterized in that

the layer structure (1) can be cooled by effusion cooling, wherein a cooling medium can emerge from the surface (43) of the porous layer (7).

18. A process for producing the layer structure (1) as claimed in one or more of claims 1 to 18,
in which an at least partially porous, at least partially gas-permeable layer (7) is applied to the substrate (4),
the porous layer (7) having pores (10) which are delimited by walls (37),
and then at least one coating (40) is at least partially applied to the walls (37).

19. The process as claimed in claim 18, characterized in that

the porous layer (7) is produced separately and then joined to the substrate (4).

20. The process as claimed in claim 18 or 19, characterized in that

the porous layer (7) is soldered, welded or adhesively bonded to the substrate (4) or is secured to the substrate (4) using holding means.

21. The process as claimed in claim 18, characterized in that

the porous layer (7) is produced together with the substrate (4).

22. The process as claimed in claim 18 or 21, characterized in that

the porous layer (7) is cast together with the substrate (4).

23. The process as claimed in claim 18, characterized in that

the coating (40) is applied by a dip-coating method, layer build-up or plasma spraying.

24. The process as claimed in claim 18, characterized in that

the layer structure (1) is applied to a newly produced component.

25. The process as claimed in claim 18, characterized in that

the layer structure (1) is applied to a refurbished component.